

Water Resources Department

725 Summer St NE, Suite A Salem, OR 97301 (503) 986-0900 Fax (503) 986-0904

January 26, 2017

Hudspeth Family LTD Partnership Attn: Brian Barney PO Box 478 Prineville, OR 97754

## Re: Barnes Butte Dam (B-38) – Inspection Summary

This dam was inspected on October 13, 2016. I performed the inspection with Dam Safety Engineer, Tony Janicek. Brian Barney was also there for the inspection. The Water Resources Department conducts routine inspections of the dam's exterior surfaces to identify conditions that might affect the safety of the dam. Dams are assigned a hazard rating based on downstream hazard to people and property, not on the condition of the dam. Barnes Butte is classified as a high hazard dam and is inspected annually.

**Summary:** The dam is reasonably maintained and operated and in fair condition for all elements but flood capacity, which is still under review, and is a major unknown issue. The valve was just returned to operable condition and was cycled during this inspection.

The results of this inspection are illustrated and described in the following photos and text. This inspection includes recommendations to keep the dam safe and functional.

## **Results of Inspection:**



Minimum freeboard as measured in the last inspection was between 3.3 and 3.5 feet, which is insufficient. The crest has decreased over time, with low spots, due to settlement of the dam, cattle trampling, and possibly vehicle use. The now reduced height of the dam also reduces the freeboard (distance between the water level and the top of the dam). This increases the risk of overtopping during significant storm events, and reduces the capacity of the emergency spillway to pass flood flows during significant storm events, since water depth in the spillway is reduced by the amount of freeboard loss.



Operation of valve

The valve was operated for the first time since some time prior to my 2011 inspection. An operational valve is essential for maintenance of the dam. It is also necessary in an emergency, where the reservoir needs to be lowered quickly. It is now important to cycle this valve on an annual basis. Cycling means completely opening the valve and then closing it. Valves that are not cycled will eventually stick and become inoperable. A working low-level conduit, which relies on this valve, is critical to the safety of this dam.



Spillway approach and control section

During our inspection, we took rough measurements of the spillway and dam crest in order to approximate the reduction in spillway capacity due to the low spots on the crest. The calculations indicate that the spillway capacity has been reduced by more than 20% from the designed condition. It should be noted that the calculations were based off of rough field measurements and as such represent an approximation of the reduced spillway capacity. Although we are certain that there is a reduction in spillway capacity because of the low spots on the crest, the actual magnitude of the reduction can only be determined through a detailed survey of the dam crest and an engineering analysis.



As previously stated, this embankment has become lower over time through a combination of settlement, trampling, and vehicle traffic. Other than having a lower crest and reduced flood capacity, there is no other evidence of problems with the embankment.



Outlet of low-level conduit

We observed increased flow through this conduit as the valve was opened, so it appears to function correctly. The steep pipe appears to be in reasonable condition. The area around the conduit, and the overall toe of the dam, are covered with brush, so seepage flows could not be evaluated.

## **Critical Issues Soon:**

- 1. Inspect the dam if there is an intense rainstorm at the site, especially if this occurs when there is snow on the ground. Utilize the EAP to determine if further action is needed. This could happen in the next few months.
- 2. Replace lost fill on the crest of the dam. By our approximate calculations this is up to two feet of depth at the lowest spots on the crest. This should occur during relatively dry periods when equipment can easily operate on the dam.

We use a standard inspection form, and a copy of the field inspection sheet for this dam is attached. Thanks again to Brian Barney for meeting with us at the dam, and for his diligent work to restore the valve to operational status. We plan to conduct a high runoff inspection this spring, and look forward to meeting the new owners or meeting whoever is responsible for dam operations at that time. Please let me know if you have any questions about this inspection.

Sincerely,

Keith Mills, P.E., State Engineer

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(503) 986-0840 Cell (541) 706-0849

C: Jeremy Giffin, Watermaster District 11 Dam Safety File B-38



## Dam Safety Inspection Form

State of Oregon Water Resources Department 725 Summer Street NE, Suite A Salem, Oregon 97301-1271 (503) 986-0900

Name of Dam:	BA	PANES BUTE File#: B-3	8
Height: 28	f	A. Storage: 420 ac. ft. Permit: R-1734 NID #: OR- 00284	
		Significant High Request Inundation Analysis for change	
Inspector(s):	#U!	Watermaster Distri	ct: 11
Others on site:	PATA	an Jardey	
Date: 10/1	3/30	Weather: OUGLOST	
Prior Inspection	Date:	Issues from prior inspection:	
Expedited Re-in	specti	ion Needed: Next Inspection Date: 2017	
Rating Criteria:	: 5-Ve	ry good; 4-Adequate 3-Maintenance or minor repair needed	
	г пеес	ded; 1- Urgent dam safety issue - action now - Contact dam owner and dam safety	engineer
directly			History and
L Dam	PE	Carth Rock Concrete Other	Rating
Up. Slope	Vege	tation, Animals, Erosion, Wave Action, Depression, Whirlpool adjacent	4
Crest	Widtl	h, Surfacing, Vegetation, Trampling, Depression, Cracks, Breaching	
J		CLEAK, LOW SPOTS	2+
Down. Slope	Vege	etation, Animals, Erosion, Seepage, Leak (muddy), Bulge, Depression, Slide	4
R. Abutment	Vege	etation, Animals, Erosion, Seepage, Leak (muddy)	4
L. Abutment	Vege	etation, Animals, Erosion, Seepage, Leak (muddy)	
		CLEPS.	4
Тое	Vege	tation, Erosion, Seepage, Leak (muddy), Boil	4
Seepage/leak flo	w	Rightgpm Centergpm Leftgpm Othergpm (use comment)	
Auxiliary dike (	(s)	□ No □ Yes □ 1 □ 2 □ 3 □ 4 □ 5 □ over 5	
		SMALL AUSMAL FILES SMEDGELACTIVITY	SOME
Comments:		SMALL AUSMAL FOLES, SMEDERACTIUSTY,	
IL Reservoir		Pool elevation: 4.7 Point of Reference:	Rating
Minimum freeb	oard	Vertical distance debris from debris line to crest ft.	
Floating Debris	/Trash	Clean Around reservoir Near spillway	4
Log Boom		✓ Not needed ☐ Present ☐ Needed ☐ Deterioration ☐ Ineffective	
Unusual Condit	ions	None Active Landslide Wildfire in Watershed Other (comments)	
Comments:		WATER FLOWENT NER -ILLWAY	
	ar .		
TH. Toe Deams Flow (gpm)	AT.		
Damage			
Sediment			
Reting	100		

IV. Conduit Contr	rol: Manual Power Other Conduit Control missing	Rating
Inlet gate	Submerged	
Trash Rack	Submerged	
Control/Stem	Clean Greased Irregular SECURED	4
Valve(s) cycling	Frozen unknown past year frequent	4
Diameter: N	Material Condition	
	Overgrown Clean Pressurized Leaking gpm	4
Secondary outlet [	Yes No Type Diameter in.	
Comments:	Yes No Type Diameter in.  GATE STEM CONTROLS REPAIRED WITH LAST YN OR Z  WILL OPENS COUNTSE CLOCKWESS / CWSBS CLOCKWESS	•
V. Spillway	Earth Rock Concrete Other	Rating
Modifications	None Reduction in capacity Feature not on design	
Approach Channel	Clear Trees/brush debris erosion	4
Control Section	Width Depth Concrete Rock Soil Culvert Unstable	4
Flashboards/Gate	None In place operational deteriorated	
Discharge Channel	✓ Clear ☐ Trees/brush ☐ leakage ☐ headcutting ( feet approaching control section, depth feet.)	4-
Stilling basin	N/A Functional Minor Erosion Severe Erosion/Undercutting	-
	☐ Yes ☑ No (use comments below)	
Stilling basin Aux. Spillway Comments:	Yes M No (use comments below)  • WATER FRONZING OVER CRECLAME  • WHITE FLOW IN SUFFECTION TO PASS SIG. FLOW FLOW - MEDICAL	royal and an
Stilling basin Aux. Spillway Comments:	Yes M No (use comments below)  • WATER FLOWZING WER STELLING  • WHITER FLOWZING WERE STELLING  • WHITE TO SUFFECTION TO PASS SEG. FLOOD FLOWD - MEDIS	Rating
Stilling basin Aux. Spillway Comments:  VI. Access and Security Vehicle access	Yes M No (use comments below)  • WATER FLOWING WER STELLING • WHITE IS SUFFECIENT TO PASS SEG. FLOTO FLOWD - 14506 I	Rating
Stilling basin Aux. Spillway Comments:  VI. Access and Securive Vehicle access Fencing, signage	Yes No (use comments below)  • WATER FLOWING DVER STELLING  •	Rating
Stilling basin Aux. Spillway Comments:  VI. Access and Securive Vehicle access Fencing, signage New Structure below decreased.	Yes No (use comments below)  • WATER FLOWZING SUFFECORIT TO PASS SIG. FLOW FLOWS — PEOS  fty  □ Public road □ all weather road □ dirt road □ cross country □ Remote □ Gates □ Secure Fence □ Camera □ Uncontrolled  dam □ Dwelling _ feet Paved public road _ feet Other sig building feet	Rating
Stilling basin Aux. Spillway Comments:  VI. Access and Securive Vehicle access Fencing, signage	Yes No (use comments below)  WATER FLOWING WEEL AND FLOW FLOW - PROS  WATER FLOWING WEEL AND FLOW FLOW - PROS  TO Public road   all weather road   dirt road   cross country    Remote   Gates   Secure Fence   Camera   Uncontrolled  dam   Dwelling   feet   Paved public road   feet   Other sig building   feet	Rating
Stilling basin Aux. Spillway Comments:  VI. Access and Securive Vehicle access Fencing, signage New Structure below decreased.	Yes No (use comments below)  • WATER FLOWZING SUFFECORIT TO PASS SIG. FLOW FLOWS — PEOS  fty  □ Public road □ all weather road □ dirt road □ cross country □ Remote □ Gates □ Secure Fence □ Camera □ Uncontrolled  dam □ Dwelling _ feet Paved public road _ feet Other sig building feet	Rating
Stilling basin Aux. Spillway Comments:  VI. Access and Securive Vehicle access Fencing, signage New Structure below d Emergency Action Plan	Yes No (use comments below)  WATER FLOWENG DVER DELLARY  WHITE SUFFECTION TO PASS SEG. FLOW FLOW - PERSON  Public road   all weather road   dirt road   cross country    Remote   Gates   Secure Fence   Camera   Uncontrolled  dam   Dwelling   feet   Paved public road   feet   Other sig building   feet    Not required   Completed   at dam (dated   None	Rating
Stilling basin Aux. Spillway Comments:  VI. Access and Securion Vehicle access Fencing, signage New Structure below description Emergency Action Plan Comments: Instrumentation data re	Yes No (use comments below)  WATER FLOWENG DVER DELLARY  WHITE SUFFECTION TO PASS SEG. FLOW FLOW - PERSON  Public road   all weather road   dirt road   cross country    Remote   Gates   Secure Fence   Camera   Uncontrolled  dam   Dwelling   feet   Paved public road   feet   Other sig building   feet    Not required   Completed   at dam (dated   None	Rating
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Stilling basin Aux. Spillway Comments:  VI. Access and Securion Vehicle access Fencing, signage New Structure below description Emergency Action Plan Comments: Instrumentation data re	Yes No (use comments below)  WATER POWERS DARK STELLAMY  WHOCH IF LANCETY TO SUFFICIENT TO PKS SIG. FLOTO Fluto - PROS  TO Public road   all weather road   dirt road   cross country    Remote   Gates   Secure Fence   Camera   Uncontrolled  dam   Dwelling   feet   Paved public road   feet   Other sig building   feet  In   Not required   Completed   at dam (dated   )   None  eviewed:   N/A   Yes   No   133	Rating 4 4 2